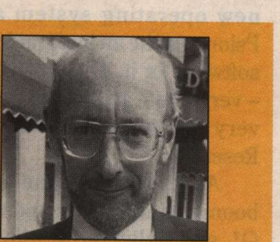
The Computer Creators

Like in films, the computer world does have British entries. **Mike James** reviews Sir Clive Sinclair

So much of the recent history of computing concerns what happened in the US, where companies like Apple grew to dominate the world. But here in the UK a surprisingly large number of smaller home-computer companies sprang up. We even managed to export a few back to the USA! Just as they had Silicon Valley we had Silicon Fen – a hi-tech area around Cambridge. In the early 1980s the UK electronics industry was vital and vigorous. And much of the reason was a single individual – Sir Clive Sinclair.

File card: Sir Clive Sinclair



Name: Clive Marles Sinclair
Born: 1940
Country: UK
Specialism: Innovation
Theories: None
Products: ZX80, ZX81, Spectrum, QL, Z88
Companies: Sinclair Radionics, Sinclair Research, Anamartic…

CLIVE SINCLAIR WAS BORN IN Surrey, the oldest of three children. His father was an engineer, and from an early age Clive showed an interest in applying science and technology. He designed a calculating machine that used punched cards and binary and was very disappointed to find that someone had thought of his 'original' idea before! He was keen on mathematics, which must have helped him understand the electronics that so fascinated him in his teenage years. All the signs of what he was to do in later years were there for anyone to see. He built miniature radios, amplifiers and a communications system for his hideout in the woods. This was all in the days when electronics was just shifting from valves to transistors.

Another indication of the future was when he applied for a summer job with Mullard, a large manufacturer of electronic components. He was rejected for being too advanced in electronics theory for his years! Still this didn't put him off. His first article for *Practical Wireless* was published while he was still at school and must have indicated to him that electronics could lead to both money and fame.

Although good at school Sinclair left at 18 – convinced that the right thing to do was to start an electronics company. Sinclair's Micro Kit Co was the result. A single-transistor radio kit was sketched out in an old exercise book and costed on the next page. The technology was easy, but the cost of advertising was a shock. How to raise necessary money? Why not write more articles for *Practical Wireless*? This he did, but the publishing delay still left him without immediate cash – so he applied for the job of editorial assistant. For a while he was effectively the editor of the magazine in all but title. Then he moved on to work for Bernard Babani writing technical books. Babani's publishing company produces lots of technical books at amazingly low prices. Sinclair produced book after book. They all sold well, and if you look at any of the circuits they contain you can see he had a grasp of transistor design that was well ahead of the average. His designs also showed ingenuity at work. By making one component do more than one job he could cut the component count – so reducing the size, cost and often power consumption.

He still wanted to start his own company and finally in 1961 got round to registering the name Sinclair Radionics Ltd, but he still lacked capital. On the promise of financial backing he left Babani – but the money did not materialise. He got another publishing job as technical editor of *Instrument Practice*. This was a good move: it gave him the chance to see all the new components he wanted – and to get hold of samples. His first money-making venture started when he discovered that Plessey was making high-quality transistors – Micro-Alloy transistors, MATs – and was throwing away the ones that didn't meet the design spec. He tested these rejects and found that they worked well enough. He bought reject MATs in boxes of 10,000 for 6d each and resold them for 7/9d and 8/6d depending on quality. He wrote another Babani book – *22 Tested Circuits using Micro-Alloy Transistors* – a marketing ploy!

The next step was to produce a kit. This turned out to be a tiny amplifier packaged into a cube measuring less than an inch. It was a success, and more followed. Nearly all made a virtue of miniaturisation. At the time, although transistors had reduced the size of electronics and made it portable, most companies were not trying to make miniature products. Just building a circuit using transistors gave a sufficient size reduction to be impressive, so why try any harder? Sinclair, however, seemed to have a vision of what electronics would be like in the future and he wanted to make it happen instantly. ➧

To achieve this he had to design exceedingly clever circuits and find novel ways of mounting them on printed circuit boards to make the best use of space. This sort of design does make the smallest possible products, but it can also make them difficult to produce. At first this didn't matter so much because they were being sold in kit form. An experienced constructor can cope with, and even enjoy, the challenge of getting a kit to work.

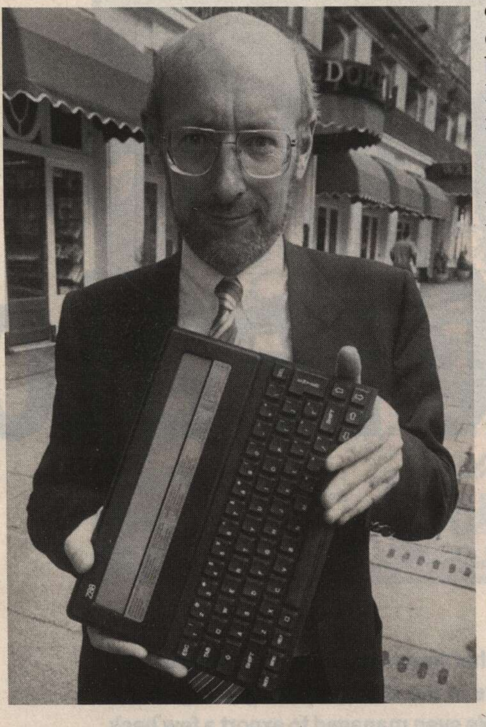
The kits continued to be produced. The Micro-6 radio smaller than a match box, the TR750 power amplifier and a range of pulse-width-modulated PWM amplifiers. Apart from being impossible to make work, the PWM amplifiers were the first excursion Sinclair Radionics took into digital electronics. All the kits were advertised in Sinclair's own instantly recognisable style. They made people want to own the product – they were exciting and all part of achieving the right image. This image extended to the first range of non-kit products. A range of hi-fi products impressed the enthusiasts with their modern looks.

In 1970 Sinclair Radionics moved into a huge building, The Mill, on the banks of the Great Ouse. The company had grown from a seller of kits to a manufacturing company. It was also large enough to allow Sinclair to start to indulge his interests – or should that be obsessions? He wanted to build a tiny TV, and research on suitable tubes was started. But what has all this got to do with computers? It should be said at this early stage in the story that Sinclair is not first and foremost a computer man. To him electronics was analog first and digital only much later. His impact on the world of computing was almost incidental.

What a calculator!

The first Sinclair product that we can classify as to do with computing was a calculator. But what a calculator! In1972, when electronic calculators were bound to desks, the Sinclair Executive was a marvel of miniaturisation. It was the first pocket calculator and it wasn't very expensive. It won Design Council awards and was put on show at the Museum of Modern Art in New York. But it wasn't much of an innovation electronically. It used a standard chip with a power-saving trick of pulsing the power supply.

After the Executive came a range of lower-priced pocket calculators. These had a reputation for not being very reliable – although much of the trouble was due to a poor design for the on-off switch. Then a scientific calculator was produced by reprogramming a standard off-the shelf chip. Finally work did begin on a personal computer design – but the bottom fell out of the calculator market and the National Enterprise Board (NEB) took over Sinclair Radionics. The design was sold to Newbury – a maker of VDUs – and it turned up some time later as the NewBrain.



The inventor and his Z88. Once he was all the rage, but now it's sadly a case of 'on yer bike' for cuddly Clive

Financially things got worse at Sinclair Radionics. None of the products launched to replace the lost calculator market were proving a success. The incredibly innovative Black Watch – the first quartz watch – suffered so many reliability problems that most were returned for repair as soon as they were shipped. The miniature TV wasn't selling well and also had reliability problems. In the end, enough was enough and the NEB split Sinclair Radionics up.

While all this was going on, Chris Curry had been looking after a small venture called Science of Cambridge. This company was to be Sinclair's lifeboat: it turned into Sinclair Research soon after the loss of Sinclair Radionics. Science of Cambridge operated in much the same way as the early Sinclair company. It produced kits and its advertising was unmistakably 'Sinclair' even though the magic name appeared nowhere. After a wrist calculator and a few other things, the real breakthrough was the MK14. This was a microprocessor trainer; a membrane keyboard, LED and that's all. It was designed by Ian Williamson but it sort of counts as Sinclair's first computer. It certainly made him think hard about producing something a little better. It also inspired Chris Curry who, fired by a vision of better machines, set up Acorn with Hermann Hauser. Their first product was the Acorn System 75 – a direct competitor to the MK14.

In 1980 the ZX80 was launched – the smallest and cheapest home computer yet. It used a Z80 microprocessor, had 1K of Ram and a 4K Rom which contained a specially written integer Basic – the whole lot cost £99 or £79 in kit form. The innovations that made this possible were typically Sinclair. For example, there was no video-controller chip – the Z80 generated the video signal. This saved a very expensive component, but meant the machine couldn't compute and display at the same time – so when it was working the screen flashed and sometimes rolled until the video signal came back. The ZX80 incorporated far too many innovations for me to mention them all, but the keyboard is especially noteworthy. This was a membrane design, typical of the Sinclair calculator range, but the Basic keywords were included on it. The user could enter PRINT with a single key, simplifying the design of the Basic interpreter because it did not need to parse input. Simple and effective.

The next step was the ZX81: a much improved design. It used a single-chip ULA (uncommitted logic array) to implement a video-controller, timing and interface unit. This reduced the chip count to just four and got rid of the flashing that plagued the ZX80. The ZX81 was probably the first usable Sinclair machine, and thousands of people learned to program using one. It even had games to play!

Arise, Sir Clive

At this point a strange series of events occurred. I was involved with them at a distance, but I still don't quite understand. The BBC decided to produce a television series on computer literacy, which was reasonable enough, but it also decided to issue specifications and badge a particular machine for the series. The contest to see who would produce the BBC micro soured the relationship between Sinclair and Chris Curry further. In the end Acorn got the contract. And it has to be said that the BBC Micro that Acorn produced was advanced for its time and had ports for every conceivable add-on. The Rolls-Royce of the 8-bit computers, it was much better than the ZX81 – but then it was four times the price.

Sinclair may not have got the BBC contract, but he was knighted in the same year. After the BBC incident the Spectrum, the ZX82, was launched. As the echoes of the effects of this machine are still reverberating, I don' t need to say much about it. It was the best-selling computer produced by any UK company and it sold millions. It also probably introduced more people to computing than the BBC – but that's a difficult point to prove.

Sinclair's next machine, though, was less of a success. The QL, or Quantum Leap, was a complete break with the past. Based on a 68000 processor, it was to be a business machine. Sinclair Research had to write a completely new operating system and got Psion to write an integrated suite of software for it. The project ran late – very late – and lots of people got very disillusioned with Sinclair Research.

As it happened, the computer boom was about over and when the QL was delivered it didn't make enough money for the troubled company. Sinclair's other obsession – the C5 electric car – was draining away resources and spoiling his image. This time Sinclair was rescued by Amstrad, who bought all rights to his company's products in 1986.

Phoenix-like Sir Clive rose yet again! This time as Cambridge Computers and the Z88 portable computer. At the same time Sinclair Research moved into satellite dishes and receivers. He set up Anamartic to build supercomputers on a single chip – so far none have been produced. It seems that the time of the computer innovator has come and gone. The IBM PC has locked us into a single design so tightly that I don't think that Sir Clive Sinclair is greatly interested in computers any more. His most recent innovation is an electric bike. ■